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ABSTRACT

The Dwight D. Eisenhower Mathematics and Science Education Program is the largest federal program for training elementary and secondary teachers in mathematics and science. It has two major components: the national program provides funding for projects of national significance and the state grant program allocates 75% of the funds to different types of state agencies and local school districts and the remaining 25% to the state agency for higher education. This document reports on: (1) how state grant funds are spent, (2) how experts view proposed improvements to the program, (3) how well the Department of Education collects and analyzes data on the program, and (4) how the various federal agencies sponsoring math and science education programs coordinate their efforts. The report concludes that the predominately short-term math and science training provided by the Eisenhower state grant program at the district level may not contribute significantly to achieving the national goal. Experts believe major changes in curriculums, instructional methods, and teacher expertise in math and science will be necessary to achieve the goal. Education program officials and experts believe that the Eisenhower program, which funds a significant amount of short-term training, cannot be expected to produce major changes. Nonetheless, many of the educators and experts see the program, as currently implemented, as very useful for several reasons. For many school districts, the Eisenhower program is the only source of funds for math and science training. Although short-term training may not cause significant changes in teaching, it can play an important role in enhancing teachers' awareness of new knowledge and teaching methods. Also, the program provides the flexibility for districts to provide various training programs to accommodate different teacher training needs. About 17 percent of the school districts did not apply for funds for the 1989-90 school year even thought they were eligible. Many of these districts would have received very small funding amounts, which they did not believe would be worth the time and resources needed to apply for and report on the grants. Current data are not available to allow policy makers to assess the impact of the Eisenhower program. Education has been slow to collect and analyze the state reports to be used to fulfill this requirement. In addition, the state reports have been found to have many errors, format inconsistencies, and variations in the amount and quality of information reported. The appendices--half of the document report: (1) the scope and methodology to determine how funds were spent; (2) the allocation of funds; (3) how funds were used; (4) lengths of training provided by participating districts by state (school year 1989-90); (5) school district participtation by state; (6) comments on the draft report from the Department of Education; and (7) a list of the major contributors to the report. (MDH)

United States General Accounting Office

GAO

Report to the Chairman, Subcommittee on Elementary, Secondary, and Vocational Education, Committee on Education and Labor, House of Representatives

November 1992

DEPARTMENT OF EDUCATION

The Eisenhower Math and Science State Grant Program

ED355115

SE 053 182

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United States
General Accounting Office
Washington, D.C. 20548

Human Resources Division

B-250484

November 10, 1992

The Honorable Dale E. Kildee
Chairman, Subcommittee on Elementary,
Secondary, and Vocational Education
Committee on Education and Labor
House of Representatives

Dear Mr. Chairman:

This report responds to your request that we review the Department of Education's Dwight D. Eisenhower Mathematics and Science Education program. Education's fiscal year 1993 budget request identified the Eisenhower program as the federal government's principal source of support for helping to achieve the national education goal of making U.S. students first in the world in math and science achievement by the year 2000. The program is currently authorized through fiscal year 1993.

You asked that we determine (1) how state grant funds are spent[1] (2) how experts view proposed improvements to the program, (3) how well Education collects and analyzes data on the program, and (4) how the various federal agencies sponsoring math and science education programs coordinate their efforts. To accomplish these objectives we interviewed officials and reviewed documents from the Department of Education, the National Science Foundation (NSF), other government offices and professional organizations, and nine school districts in two states. We also analyzed state reports to Education on their school year 1989-90 Eisenhower program results[2] and two recent studies that dealt with the Eisenhower program.[3] We also reviewed written comments and statements provided by numerous school officials, as well as the general public, to the Secretary of Education regarding the reauthorization of the Eisenhower program. (See app. I for further details on the scope and methodology of our review.) On June 5, 1992, we briefed your staff on our preliminary results. This report provides our final results.

[1]The Eisenhower program has two components, a state grant program and a national program. As agreed, we focused on the state grant program, funded at $240 million in fiscal year 1992. Education's Office of Elementary and Secondary Education administers the state grant program and the Office of Educational Research and Improvement administers the $16 million national program.

[2]At the outset of our review, the 1989-90 school year was the only year for which Education had collected enough Eisenhower program state reports to allow for analysis.

[3]The Eisenhower Mathematics and Science Education Program: An Enabling Resource for Reform, SRI International in collaboration with Policy Studies Associates and Inverness Associates, Feb. 1991; and In the National Interest: The Federal Government in the Reform of K-12 Math and Science Education, Carnegie Commission on Science, Technology, and Government, Sept. 1991.

Background

Education's math and science program was created in 1984 by title II of the Education for Economic Security Act (P.L. 98-377). The program was repealed and incorporated into the Dwight D. Eisenhower Mathematics and Science Education Program under the Hawkins-Stafford Elementary and Secondary School Improvement Amendments of 1988 (P.L. 100-297). The Eisenhower program is the largest federal program for training elementary and secondary teachers in math and science. Through its two major components—the national program and the state grant program—the Eisenhower program is intended to enhance the abilities of teachers and the quality of math and science instruction in elementary and secondary schools and, thus, improve the nation's economic position and its security.

The national program is to support grants and cooperative agreements for projects of national significance. In 1989, 29 projects covered such activities as developing new curriculum standards in several states. The national program's fiscal year 1992 appropriation is $16 million.[4]

Funds for the state grant program, which have grown from about $127 million in fiscal year 1990 to $240 million in fiscal year 1992, are distributed according to a formula based on student populations and poverty levels.[5] The funds are allocated among different types of state agencies and local school districts (see app. II). Seventy-five percent of each state's grant goes to the state education agency, which allocates most of the money to local school districts for a wide variety of teacher training projects. The state education agency retains a small portion of the funds to provide technical assistance and administration and to fund demonstration and exemplary projects.

The remaining 25 percent of a state's grant goes to the state agency for higher education, which awards competitive grants to institutions of higher education for training projects. These projects tend to be longer duration, in-service training programs for elementary and secondary teachers. To receive a grant an institution must enter into an agreement with one or more districts to provide training for teachers in those districts. (App. III provides examples of projects funded by state agencies and school districts.)

[4]An additional $12 million was appropriated for fiscal year 1992 for regional consortia to disseminate exemplary math and science instructional materials and provide technical assistance.

[5]States and school districts with larger numbers of low-income students receive proportionately more money.

The other major source of funds for elementary and secondary math and science education is NSF, with $276 million in fiscal year 1992. Many other federal agencies, such as the Departments of Energy, Agriculture, Health and Human Services, and the Environmental Protection Agency, also fund some elementary and secondary math and science education programs, but at significantly lower levels than Education and NSF. All these agencies coordinate their efforts through the Committee on Education and Human Resources of the Federal Coordinating Council for Science, Engineering, and Technology (FCCSET).[6]

Results in Brief

The predominately short-term math and science training provided by the Eisenhower state grant program at the district level may not contribute significantly to achieving the national goal. Experts believe major changes in curriculums, instructional methods, and teacher expertise in math and science will be necessary to achieve that goal. Education program officials and experts believe that the Eisenhower program, which funds a significant amount of short-term training, cannot be expected to produce major changes.

Nonetheless, many of the educators and experts we spoke with see the program, as currently implemented, as very useful for several reasons. For many school districts, the Eisenhower program is the only source of funds for math and science training. Although short-term training may not cause significant changes in teaching, a study published in 1991 by SRI International (formerly Stanford Research Institute) noted short-term training can play an important role in enhancing teachers' awareness of new knowledge and teaching methods. Also, the program provides the flexibility for districts to provide various training programs to accommodate different teacher training needs. Because of these benefits, the education experts we met with, and respondents to Education's request for comments, did not believe changes recommended in recent studies—such as requiring that all training be of minimum duration and making program funding totally competitive—were necessary.

About 17 percent of the school districts did not apply for funds for the 1989-90 school year even though they were eligible. Many of these districts would have received very small funding amounts, which they did not

[6]FCCSET is an executive branch policy-coordinating body for science, engineering, and technology issues within the White House Office of Science and Technology Policy. In 1989 and 1990 the FCCSET committee structure was consolidated. This led to the formation, in May 1990, of the Committee on Education and Human Resources, with representatives from 16 agencies.

believe would be worth the time and resources needed to apply for and report on the grants.

Current data are not available to allow policy makers to assess the impact of the Eisenhower program. The Congress mandated that Education summarize and report descriptive information obtained from the states. Education has been slow to collect and analyze the state reports to be used to fulfill this requirement. In addition, we found that the state reports have many errors, format inconsistencies, and variations in the amount and quality of information reported.

NSF, the other major federal funding source for precollege math and science education programs, has agreed formally with Education to improve coordination in training elementary and secondary teachers.

Short-Term Training Not Expected to Cause Major Change

State reports to Education as well as other studies show that most of the district training paid for with Eisenhower funds was in the form of short-term in-service training seminars and workshops for elementary and secondary teachers. Data from the 1989-90 school year performance reports to Education show that nationwide, at least 31 percent of districts primarily provided training that lasted 1 day or less. (See app. IV.) Likewise, a study by SRI International covering program activities in school years 1985-86 to 1988-89 reported that the median amount of district-sponsored training that teachers received was 6 hours.

Many experts and researchers in the field of teacher training believe that training needs to be sufficiently intense to enable teachers to understand new ways of thinking and doing, and then to integrate these understandings into their instructional practice. There is general agreement among experts that training of 1 day or less, although helpful, will not produce substantive change. We found no consensus on the minimum length of training needed to cause substantive change in teaching methods. Currently the administration is encouraging more intensive training for district programs but not specifying a duration.[7]

State and local officials and education experts noted that the cost and difficulty of scheduling teacher training limits districts' abilities to provide more extensive training. If teachers are trained during school hours, then substitute teachers have to be hired. While training during nonschool

[7]For the grants awarded to institutions of higher education the administration is proposing that all training programs be at least 20 days long.

hours can and does occur, officials told us it is more difficult to schedule teachers for those time periods.

Many See Value in Current District Activities

Even though the district training activities under the Eisenhower program may not have a major impact on math and science teaching, most officials and experts we spoke with supported the program and do not support various proposals to change it.

For example, in its 1991 report, the Carnegie Commission on Science, Technology, and Government recommended the Eisenhower program be made fully competitive.[8] The Commission believed a competitive structure would provide better mechanisms for program oversight and accountability. All the officials we interviewed, and most of the respondents to Education's request for comments, believe that making the program competitive would reduce the program's flexibility and direct funds to those districts with the best grant writing skills and not necessarily those with the greatest needs. These officials point out that in many districts, the Eisenhower program has been the only source of funding used for math and science training.

The 1991 SRI International report also recommended that Education should encourage states to ask or require that districts focus more of their funds on longer duration training. Responses provided to Education on the suggestion for mandating longer training times generally supported longer training programs but opposed making them mandatory. Local education officials indicated the program's current flexible structure allows training programs to be tailored to meet teachers' differing needs. Experts noted that short-term training can serve a valuable purpose in increasing awareness of new methods and curricula.

The flexibility of the program allows districts to provide an array of training programs. Despite the cost and difficulty of providing longer, more intensive training, some districts were able to do so. One approach that is being used is called the lead teacher program. Teachers are selected for extensive training and become focal points in their individual schools for providing training and information to other teachers. One large district we visited selects 32 elementary teachers each semester to be math lead teachers. Each teacher receives about 100 hours of training on both content and new instructional activities and also is provided materials and

[8]Typically, in the Department of Education the competitive grant process takes several months and involves publishing regulations, publicizing the grant competition, identifying and selecting readers to review applications, processing grant applications, and conducting each grant award competition.

a resource handbook. The district's goal is to have two math lead teachers—one for lower grades and one for higher grades—for each elementary school. The district also uses the lead teacher program for science.

Several other districts in the two states we visited have programs that include more intensive training. A district in Virginia gave a 20-hour course for elementary teachers over 8 weeks on the science content for various grade levels. A district in Maryland offered a 3-day workshop on how to teach algebra to at-risk students. The 1989-90 state reports indicated that at least 18 percent of the districts provided extended workshops and mini-courses and at least 5 percent provided full-term college courses.[9]

A third proposal, contained in the SRI International report, is to allocate more funds to state education agencies and less to districts. Opinions about this proposal are mixed. The SRI International report concluded that districts provide the least intense and effective training whereas the state education agencies have the potential to effect the improvement of curricula across an entire state. Some officials and experts agree, saying that if state agencies had more funds, they could provide more leadership and fund more demonstration projects to help districts realize statewide math and science improvements. In contrast, some district officials and experts disagree. They point to what they see as limited direction and leadership provided at the state level.

Many Districts Did Not Participate

For the 1989-90 school year, 2,587 or 17 percent of the nation's 15,150 districts did not apply for grants they were eligible for through the state grant program.[10] The extent of participation varied among states. State reports to Education showed that 13 states had nonparticipation rates of 20 percent or higher and 5 states had nonparticipation rates greater than 38 percent. (See app. V.) Education and state education officials told us that many districts did not participate because they were eligible for very small grants and they did not want to spend resources on applications and reports for such a small amount of money. About 75 percent of the nonparticipants would have received grants less than $1,000. By 1992, the level of funding for the state program had increased nearly 90 percent over

[9]Education did not define how long an extended workshop or mini-course was, but said that they were longer than 1 day.

[10]Some of these districts may have participated through agreements with institutions of higher education.

the 1990 level. We do not know how this increase may have affected participation rates.

In 1990, the program was amended to require the majority of districts receiving less than $6,000 to form consortia to pool their funds and use them more effectively.[11] It is too soon to know this requirement's impact on the level of district participation. Data are not available to determine how many districts receive allocations of less than $6,000 and, further, state education agencies can waive the consortia requirement. Although some districts with small allocations may be encouraged to join consortia, others who participate now with less than $6,000 grants may choose not to participate.

Reporting Problems Hinder Assessment of Program Impact

Determining the overall impact of the Eisenhower program or its contribution to meeting the math and science education goal is difficult. Education funded one major study of the program, the SRI International study, which provides information about school years 1985-86 to 1988-89. Although Education also collects yearly data from the states, these data are limited.

Education is required by law to collect descriptive information from the states and to report to the Congress on the status of the Eisenhower program. Each year, state education agencies and state agencies for higher education are required to report how they have used Eisenhower funds in the training of teachers in math and science. Separate reports are required for school district activities, state demonstration and exemplary projects, and activities of institutions of higher education. The first set of Eisenhower annual reports to Education from the states, covering the 1989-90 school year, were due at the end of 1990.

Our analysis of the 1989-90 state reports showed that there were many missing reports. Each state and the District of Columbia received grants. As of June 1992, five state education agency reports on districts' activities, nine state education agency demonstration and exemplary projects reports, and eight state education agency for higher education reports were missing or in unusable form. Among the reports that had been received, many were not responsive to Education's questions. In addition,

[11]A consortium is formed when a district agrees to combine its Eisenhower funds with those of at least one other district and/or with an institution of higher education.

Education had not analyzed the reports that had been received.[12] We expect many of these problems to persist for report data now becoming available for school year 1990-91. Although some improvements to the performance report forms have been made, some of the questions remain unclear.

Education officials cited insufficient staff as the main reason for delayed data collection and analysis. The officials told us that, starting with the 1991-92 performance reports, they plan to (1) improve the quality of their data collection instrument to better ensure that states report complete and reliable information and (2) help ensure that they receive reports from all states. Additionally, Education commented it is developing a data collection plan for math and science education that calls for a major study of the impact of the Eisenhower program. As of October 1992, this plan had not been approved by the Office of Management and Budget.

Lead Agencies' Coordination Efforts

FCCSET's Committee on Education and Human Resources has the responsibility for organizing and coordinating the 16 federal agencies involved in math and science education. Some agencies focus on the precollege and college levels, and others on specific types of science or math education, such as public science literacy. For example, the Department of Energy has formed academic partnerships at several 2- and 4-year colleges to address the workforce shortages in the area of environmental restoration and waste management.

FCCSET's Committee on Education and Human Resources has issued two reports on how to marshal resources to promote math and science in the United States. The committee believes that federal programs and activities for precollege math and science do not comprise a comprehensive, coordinated strategy, and the committee is working towards that goal. The committee's January 1992 report on the proposed fiscal year 1993 budget noted, for example, that to ensure accountability and program effectiveness, NSF has initiated a comprehensive evaluation of all its major education and human resource programs to be conducted over a 5-year cycle. NSF will also coordinate the evaluation of corresponding initiatives in other federal agencies.

[12]In May 1992, the Department's Office of Inspector General also reported that Education was having difficulty collecting reliable information from the states. See Improvements Needed to Assure the Eisenhower Mathematics and Science Education Program Meets the Objectives of National Education Goal Number 4 and the Eisenhower Act, Office of Inspector General, U.S. Dept. of Education, Management Improvement Report No. 92-09 (Chicago: 1992).

The two federal agencies most directly involved in precollege math and science education are Education and NSF. Education, through the Eisenhower program, focuses on improving teacher preparation; NSF focuses on teacher preparation and developing curricula and materials for elementary and secondary math and science instruction. These agencies have undertaken steps to improve coordination of their efforts.

In January 1992, the Secretary of Education and the Director of NSF signed a memorandum of understanding. It noted that, in the past, coordination between the two agencies consisted primarily of staff interactions resulting in sharing resources and expertise. The purpose of the memorandum is to implement a formal mechanism for interaction involving senior-level officials to

"... ensure effective planning, information exchange, and collaboration at the elementary and secondary levels."

They agreed to establish a working group of senior-level officials. As of September 1992, the group had met three times to review each agency's programs, identify coordination needs, and assign staff to work on them.

A key effort now underway by NSF is its Statewide Systemic Initiatives program. Competitive awards are made to states to initiate improvements in science, math, engineering, and technology education through comprehensive changes to the state's education system. The awards, 5-year grants of up to $10 million each, are cooperative agreements that make NSF a partner with the state to provide monitoring, technical assistance, and evaluation. Ten states received NSF grants in fiscal year 1991 and 10 states and Puerto Rico received funding in fiscal year 1992. NSF plans to fund 5 to 7 more states in fiscal year 1993. The total budget for the Statewide Systemic Initiative is expected to be $250 million over 7 years.

Each grant recipient has proposed how it will plan for major changes in science and math education by (1) involving all the state's key players, starting with the governor and the legislature; (2) addressing such elements of the education system as curricula, teacher preparation and training, student assessment, and instructional materials; and (3) maximizing state and local resources. Education's Eisenhower program funds can be used by state agencies and districts to provide teacher training needed to support implementing changes under NSF grants.

Agency Comments

The Department of Education described our study as generally a fair assessment of the Eisenhower program and expressed appreciation for our work. Education officials said that, besides the Eisenhower program, other efforts are essential to helping make U.S. students first in the world by the year 2000. As examples, the officials cited the development of curriculum frameworks and regional consortia to disseminate exemplary materials.

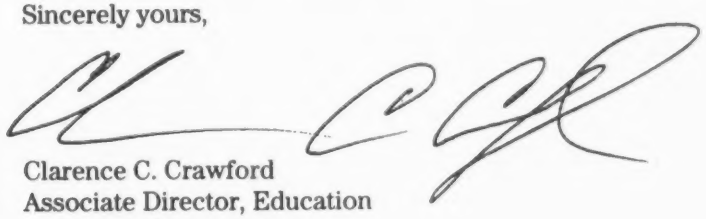
Regarding the point that data are not available to allow policy makers to assess the impact of the Eisenhower program, Education mentioned that in 1989 it commissioned SRI International to conduct a national study of the Title II/Eisenhower program. Education noted that this study, completed in 1991, laid the foundation for continuing efforts by the Department to assess its math and science programs. We agree that this study was extensive and provided useful information, but the data are now at least 3 years old.

Education pointed out that the SRI International study found a 93-percent participation rate for school year 1988-89 whereas we reported that the state reports to Education showed an 83-percent participation rate for school year 1989-90. Education questioned whether so much variance could occur in 1 year. We did not verify SRI International's analysis. However, the figure SRI International cited was an estimate based on a sample of about 10 percent of school districts. In contrast, our analysis covers all school districts and is based on information provided by all 50 states and the District of Columbia. We used the state reports to Education, and where the data were incomplete or inconsistent we verified the 1989-90 participation rates with state education agencies.

Education officials also stressed the importance of short-term training as essential in some instances to implementing major and enduring improvements. However, NSF officials—who did not provide written comments but whose oral comments we have incorporated where appropriate—said activities lasting a day or less usually should be called professional development rather than training. (Education's comment letter is reproduced as app. VI.)

As arranged with your office, we are sending copies of this report to the Secretary of Education and other interested parties. Please call me on (202) 512-7014 if you or your staff have any questions. Other major contributors are listed in appendix VII.

Sincerely yours,



Clarence C. Crawford
Associate Director, Education
and Employment Issues

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Abbreviations

FCCSET	Federal Coordinating Council for Science, Engineering, and Technology
NSF	National Science Foundation

Scope and Methodology

To determine how Eisenhower funds were spent we: (1) interviewed Education officials, an adviser and a contributor to a study of the Eisenhower program, and officials of six education professional groups; (2) visited Maryland and Virginia officials at their respective state agencies for higher education, state education agencies, and nine school districts; (3) analyzed 1989-90 school year state performance reports to Education; and (4) reviewed two studies on mathematics and science education in the United States and research papers on the effectiveness of different types and lengths of teacher in-service training activities.

To obtain reactions to suggestions for program improvement, we interviewed officials from Education, state agencies and school districts[1] and professional groups. We reviewed 24 statements by educators and experts from across the country that were presented during 1992 public hearings on the upcoming Eisenhower program reauthorization. Additionally, in the February 4, 1992, Federal Register the Secretary of Education invited written comments from the public regarding the reauthorization of more than 50 elementary and secondary education programs. We reviewed Education's summary of these comments. There were 118 respondents who specifically addressed the Eisenhower program and most of them were school district, state education agency, and university personnel.

To determine the level of coordination among federal agencies providing funding for math and science programs, we interviewed officials at the Education Department; the National Science Foundation; the Federal Coordinating Council for Science, Engineering, and Technology's (FCCSET) Committee on Education and Human Resources; and state education agency officials in Maryland and Virginia.

We conducted our work between September 1991 and July 1992 in accordance with generally accepted government auditing standards.

The various organizations we visited are listed below.

[1]The school districts we selected represent a mix of urban, suburban, and rural communities.

State Agencies	Maryland State Department of Education Maryland Higher Education Commission Virginia State Education Agency Council of Higher Education for Virginia
School Districts: Maryland	Baltimore City Public Schools Kent County Public Schools Montgomery County Public Schools Prince George's County Public Schools
School Districts: Virginia	Arlington County Public Schools Fairfax County Public Schools Henrico County Public Schools Manassas City Public Schools Richmond City Public Schools
Professional Organizations	American Association for the Advancement of Science Association for Supervisors and Curriculum Development Council of Chief State School Officers National Council of Teachers of Mathematics National Science Teachers Association SRI International

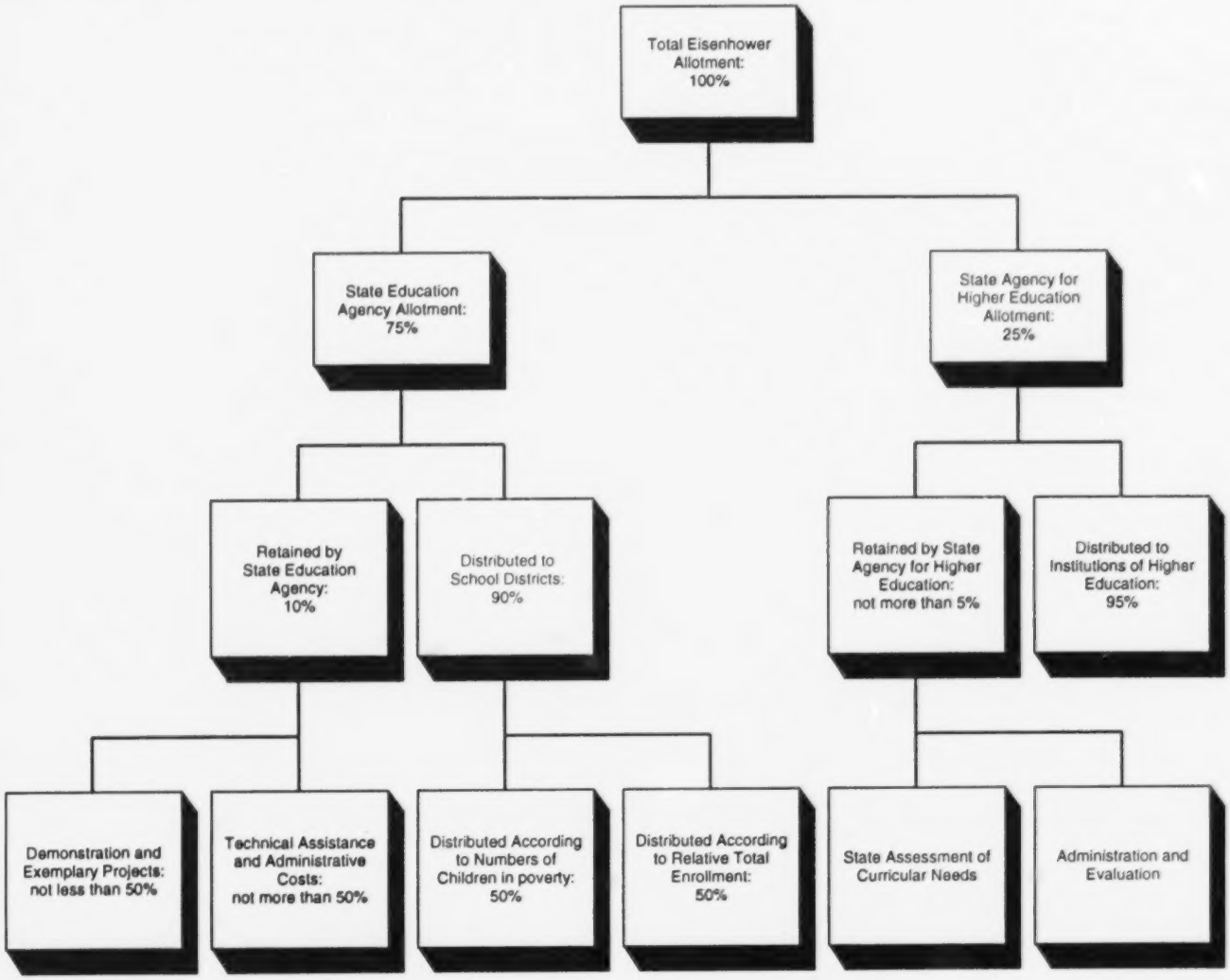
How Eisenhower Funds Are Allocated

The Eisenhower program is a formula grant program whereby the federal government allocates funds to states who in turn allocate the money to state education agencies and school districts. Seventy-five percent of a state's Eisenhower funds go to the state education agency, while the other 25 percent go to the state higher education agency. State education agencies pass on 90 percent of the funds they receive to school districts based on the number of school-age children and their poverty levels. Of the remaining 10 percent, state education agencies may spend no more than half on administration and technical assistance to school districts and no less than half for demonstration and exemplary projects.[1]

State agencies for higher education must allocate not less than 95 percent of their funds as competitive grants to institutes of higher education or other nonprofit institutions, public and private. The state agency for higher education may retain up to five percent of its allotment to pay for administration, evaluation and needs assessment. Figure II.1 depicts the flow of funds among the various components.

[1]Demonstration and exemplary projects include: (1) training to upgrade teacher skills, (2) purchases of instructional equipment and materials, and (3) special projects for historically underrepresented and underserved populations, and for gifted and talented students.

Figure II.1: Flow of Eisenhower Funds Among State Education Agencies and School Districts


Total Eisenhower Allotment: 100%
State Education Agency Allotment: 75%
State Agency for Higher Education Allotment: 25%
Retained by State Education Agency: 10%
Distributed to School Districts: 90%
Retained by State Agency for Higher Education: not more than 5%
Distributed to Institutions of Higher Education: 95%
Demonstration and Exemplary Projects: not less than 50%
Technical Assistance and Administrative Costs: not more than 50%
Distributed According to Numbers of Children in poverty: 50%
Distributed According to Relative Total Enrollment: 50%
State Assessment of Curricular Needs
Administration and Evaluation

How Eisenhower Funds Have Been Used

The following examples, taken from Maryland and Virginia, illustrate the variety of uses of Eisenhower funds by districts, state education agencies, and state agencies for higher education. These examples do not include all the activities supported by Eisenhower funds in these districts.

District Use of Eisenhower Funds

Arlington County Schools

In mathematics, for school year 1989-90, Arlington County used funds to allow elementary and secondary teachers to attend: (1) regional conferences of mathematics educators to learn the standards of the National Council of Teachers of Mathematics and (2) local workshops that provided 14 hours of instruction, with hands-on activities for the participants.

In science, for school year 1989-90, Arlington County used funds to train secondary teachers of chemistry, physics, and biology, and elementary teachers. Workshops at the secondary level updated science staff with recent developments in science knowledge and technology in their specific disciplines. Thirty primary grade teachers attended a 200-acre facility the county has for outdoor science instruction. Primary grade teachers also attended noncredit courses that offered science education in courses designed for teachers for (1) grades K-1, (2) grades 2-3, and (3) grades 4-5. The courses ran 32 hours, spread over 8 weeks.

Baltimore City Public Schools

Eisenhower funds have supported a program that teaches elementary school teachers how to demonstrate a life cycle using a plant that completes its life cycle in 35 days.

Kent County Public Schools

Kent County used its school year 1991-92 Eisenhower funds to send teachers to various workshops and conferences for in-service training. For example, 20 teachers attended a 2-day geology workshop and 6 teachers went to the 2-day Eisenhower Math-Science Conference sponsored by the Maryland State Department of Education. Fourteen teachers took a college semester course on astronomy.

Manassas City Schools

Eisenhower school year 1991-92 funds were used to provide conferences, workshops, and demonstration labs for elementary and secondary teachers to integrate mathematics and science curricula, as well as to provide teachers with new ideas and techniques to motivate students. Hands-on activities for science and mathematics were emphasized. Teachers were encouraged to seek activities that entice minority students into mathematics and science, areas that traditionally have not had high minority participation. Funds also provided activities that complement some community activities sponsored by the schools and community organizations that focus on women in science and mathematics fields. In addition, elementary science and mathematics teachers were to get further computer training.

Montgomery County Schools

Montgomery County used Eisenhower funds to train grades 3-5 teachers in the National Council of Teachers of Mathematics standards. The county also used Eisenhower funds to underwrite an effort by a cadre of middle school teachers to develop a revised mathematics curriculum.

Eisenhower funds also were used to teach elementary school teachers strategies and content of elementary science: for example, how to conduct egg incubation experiments. Secondary school teachers were trained in the use of nontraditional classroom assessment techniques, with the expectation that these teachers would teach other teachers. Eisenhower funds also supported teachers attending such meetings as the National Science Teachers Association meeting in Boston.

Prince George's County Schools

Prince George's County used Eisenhower funds in school year 1990-91 to train teachers to be facilitators of new approaches to mathematics in their local schools. The county used Eisenhower funds to underwrite science courses for 25 middle school teachers in the Loyola College master's program.

State Education Agency Use of Eisenhower Funds: Demonstration and Exemplary Projects

Maryland	For school year 1990-91, the Maryland State Department of Education used its demonstration and exemplary funds to sponsor a math and science conference for up to 400 teachers, a meeting comparable to a regional National Science Teachers Association conference. This conference allowed mathematics and science teachers to interact with higher education people. To help defray the costs of the conference, each of the state's 24 school districts returned 1 or 2 percent of its Eisenhower funds to the state education agency.
Virginia	For the 1991 school year, the Virginia Department of Education used demonstration and exemplary funds to apply for a National Science Foundation Statewide Systemic Initiatives grant. In 1990, Virginia demonstration and exemplary funds supported an integrated mathematics and science program for the Norfolk City Public Schools, a technology planning grant to a public television station, a science-by-van project, and a science video series for Fairfax County Public Schools.

State Agency for Higher Education Use of Eisenhower Funds

Maryland	St. Mary's College received a $62,660 grant for 36 elementary teachers from four counties to attend a 2-week in-service workshop, with follow-up sessions in the 1992-93 school year. The program showed how science can be taught as part of an integrated curriculum through a series of hands-on, guided inquiry exercises that cultivate science process skills.

Johns Hopkins University received a $30,965 grant to train the faculty and staff of a new science and technology school in Baltimore. The project, involving a partnership with Towson State University, the Regional Technology Center, and the Baltimore City Public Schools Science Department as partners, focused on a hands-on training to use computers in science.

The University of Maryland received a $100,000 grant for experienced high school teachers to attend a 5-week summer program at the College Park campus that focused on exploring methods and strategies for effectively teaching introductory biology.

Prince George's Community College received a $100,000 grant to conduct summer institutes at its Chemistry, Life Science, Physical Science, and Environmental Science Institute for 80 elementary teachers. The central components will include basic concepts and overcoming common misconceptions.

Montgomery Community College received a $35,000 grant to conduct a 3-week summer workshop in astronomy for science teachers in grades 6 through 9. The course will teach not only astronomy but the physics and mathematics necessary to understand astronomy, and will emphasize the interdependence of astronomy and other sciences, such as chemistry, and biology.

Virginia

Bluefield College received a $60,515 grant to enhance math knowledge and teaching skills of 50 upper-grade-level elementary teachers from eight localities in a 3-day summer workshop and six follow-up workshops in the succeeding year. Participants were to take materials back to their schools to share with other teachers.

Clinch Valley College received a $61,912 grant to provide in-service training to enhance science teaching skills in elementary and middle schools. Seventy-two teachers and principals from nine localities attended four weekend institutes held during the school year with classroom follow-ups. Teachers also were to direct in-service workshops in their local school districts for an additional 800 teachers and principals.

Hampden-Sydney College received a $55,000 grant—an extension of a similar project funded last year—to conduct two series of regional 1-day workshops. One workshop was to be an introduction to physics for 69

high school physics teachers who could not be served last year. The second workshop was to provide an advanced session for 51 high school physics teachers who were served previously. Participants were to receive apparatus, lab manuals, and videotaped instructions to take back to their classrooms.

Mary Washington College received a $29,000 grant to conduct a 2-week summer workshop followed by participant-directed workshops during the school year for 16 elementary school teachers, grades 3 through 5, from 5 locations. The training was to improve the teaching skills needed for physical sciences and mathematics, with a focus on the Department of Education's Standards of Learning and the National Council of Teachers of Mathematics standards.

The University of Virginia received a $35,200 grant for five high school science mentor teachers to work with 15 elementary and middle-school teachers through the Virginia Public Education Network. This network will connect approximately 2,000 Virginia schools in 137 school districts to the national interuniversity network, Internet. All teachers were to have use of a computer to develop, disseminate, and diffuse instructional materials to each other and to other interested teachers on the network.

Lengths of Training Provided by Participating School Districts With Eisenhower Funding (School Year 1989-90)

The following table is based on data that show the lengths of training school districts primarily provided to teachers in school year 1989-90 through the use of Eisenhower program funds. These districts reported the lengths of this training to the Department of Education in performance reports. There were 12,563 districts in 50 states and the District of Columbia that participated in the Eisenhower program in 1989-90. Of them, 40 states representing 8,519 (68 percent) of the districts provided complete data on lengths of training provided with Eisenhower funds. There are no data for 10 states and the District of Columbia, representing 4,044 (32 percent) of the participating districts. Because this information is not available, the national totals at the end of the table undercount the number of districts providing each type of training.

	Workshops or seminars—1 day or less		Extended workshops or minicourses		Full-term courses		Combination of short and long courses		Total districts
State	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.
Alabama	79	64.9	38	31.8	4	3.3	0	0.0	121
Alaska	32	100.0	0	0.0	0	0.0	0	0.0	32
Arizona	59	44.0	39	29.0	21	16.0	15	11.0	134
Arkansas	261	80.0	33	10.0	3	1.0	29	9.0	326
California	•	•	•	•	•	•	•	•	878
Colorado	•	•	•	•	•	•	•	•	163
Connecticut	•	•	•	•	•	•	•	•	142
District of Columbia	•	•	•	•	•	•	•	•	1
Delaware	8	43.0	6	32.0	1	7.0	3	18.0	18
Florida	•	•	•	•	•	•	•	•	69
Georgia	0	0.0	0	0.0	0	0.0	178	100.0	178
Hawaii	0	0.0	0	0.0	0	0.0	1	100.0	1
Idaho	16	20.0	38	50.0	16	20.0	8	10.0	78
Illinois	•	•	•	•	•	•	•	•	909
Indiana	57	20.0	144	50.0	29	10.0	57	20.0	287
Iowa	•	•	•	•	•	•	•	•	431
Kansas	130	50.0	90	35.0	23	9.0	15	6.0	258
Kentucky	39	22.0	104	58.0	36	20.0	0	0.0	179
Louisiana	60	91.0	0	0.0	6	9.0	0	0.0	66
Maine	13	8.0	85	52.0	21	13.0	44	27.0	163
Maryland	9	38.0	2	8.0	1	4.0	12	50.0	24
Massachusetts	138	44.0	62	20.0	37	12.0	75	24.0	312
Michigan	280	50.0	128	22.9	3	0.6	148	26.5	559

(continued)

State	Workshops or seminars—1 day or less		Extended workshops or minicourses		Full-term courses		Combination of short and long courses		Total districts
	No.	Percent	No.	Percent	No.	Percent	No.	Percent	No.
Minnesota	•	•	•	•	•	•	•	•	405
Mississippi	75	53.0	29	21.0	18	13.0	18	13.0	140
Missouri	•	•	•	•	•	•	•	•	450
Montana	254	80.0	48	15.0	10	3.0	6	2.0	318
Nebraska	147	70.0	21	10.0	0	0.0	42	20.0	210
Nevada	0	0.0	15	88.0	0	0.0	2	12.0	17
New Hampshire	109	90.0	12	10.0	0	0.0	0	0.0	121
New Jersey	•	•	•	•	•	•	•	•	467
New Mexico	37	60.0	12	20.0	12	20.0	0	0.0	61
New York	240	40.0	347	58.0	12	2.0	0	0.0	599
North Carolina	67	50.0	13	10.0	0	0.0	54	40.0	134
North Dakota	146	50.0	103	35.0	29	10.0	15	5.0	293
Ohio	343	55.0	249	40.0	31	5.0	0	0.0	623
Oklahoma	27	10.0	27	10.0	27	10.0	189	70.0	270
Oregon	70	24.0	107	37.0	35	12.0	78	27.0	290
Pennsyivania	499	98.0	5	1.0	5	1.0	0	0.0	509
Rhode Island	4	10.0	0	0.0	0	0.0	31	90.0	35
South Carolina	0	0.0	0	0.0	90	100.0	0	0.0	90
South Dakota	•	•	•	•	•	•	•	•	129
Tennessee	0	0.0	0	0.0	0	0.0	126	100.0	126
Texas	371	37.0	230	23.0	20	2.0	381	38.0	1,002
Utah	0	0.0	0	0.0	0	0.0	39	100.0	39
Vermont	34	70.0	0	0.0	10	20.0	5	10.0	49
Virginia	26	21.0	43	36.0	8	7.0	43	36.0	120
Washington	30	13.6	130	59.2	0	0.0	60	27.2	220
West Virginia	10	18.0	13	24.0	18	32.0	14	26.0	55
Wisconsin	209	50.0	104	25.0	104	25.0	0	0.0	417
Wyoming	16	36.0	22	48.0	1	2.0	6	14.0	45
Total	**3,895**	**31.0**	**2,299**	**18.3**	**631**	**5.0**	**1,694**	**13.5**	**12,563**

School District Participation in the Eisenhower Program (School Year 1989-90)

State	Participating districts		Nonparticipating districts		Total districts
	Number	Percent	Number	Percent	Number
Alabama	121	92.4	10	7.6	131
Alaska	32	59.3	22	40.7	54
Arizona	134	61.2	85	38.8	219
Arkansas	326	98.2	6	1.8	332
California	878	82.5	186	17.5	1,064
Colorado	163	92.6	13	7.4	176
Connecticut	142	79.3	37	20.7	179
D.C.	1	100.0	0	0.0	1
Delaware	18	94.7	1	5.3	19
Florida	69	95.8	3	4.2	72
Georgia	178	95.2	9	4.8	187
Hawaii	1	100.0	0	0.0	1
Idaho	78	67.8	37	32.2	115
Illinois	909	94.8	50	5.2	959
Indiana	287	96.0	12	4.0	299
Iowa	431	100.0	0	0.0	431
Kansas	258	84.9	46	15.1	304
Kentucky	179	100.0	0	0.0	179
Louisiana	66	89.2	8	10.8	74
Maine	163	89.1	20	10.9	183
Maryland	24	100.0	0	0.0	24
Massachusetts	312	86.2	50	13.8	362
Michigan	559	99.5	3	0.5	562
Minnesota	405	93.3	29	6.7	434
Mississippi	140	89.7	16	10.3	156
Missouri	450	81.5	102	18.5	552
Montana	318	57.8	232	42.2	550
Nebraska	210	24.9	635	75.1	845
Nevada	17	100.0	0	0.0	17
New Hampshire	121	70.8	50	29.2	171
New Jersey	467	79.8	118	20.2	585
New Mexico	61	69.3	27	30.7	88
New York	599	85.3	103	14.7	702
North Carolina	134	100.0	0	0.0	134
North Dakota	293	93.6	20	6.4	313
Ohio	623	94.0	40	6.0	663

(continued)

State	Participating districts		Nonparticipating districts		Total districts
	Number	Percent	Number	Percent	Number
Oklahoma	270	45.5	323	54.5	593
Oregon	290	96.7	10	3.3	300
Pennsylvania	509	96.2	20	3.8	529
Rhode Island	35	94.6	2	5.4	37
South Carolina	90	98.9	1	1.1	91
South Dakota	129	67.2	63	32.8	192
Tennessee	126	90.6	13	9.4	139
Texas	1,002	94.0	64	6.0	1,066
Utah	39	97.5	1	2.5	40
Vermont	49	80.3	12	19.7	61
Virginia	120	88.9	15	11.1	135
Washington	220	74.3	76	25.7	296
West Virginia	55	100.0	0	0.0	55
Wisconsin	417	97.0	13	3.0	430
Wyoming	45	91.8	4	8.2	49
Total	**12,563**	**83.0**	**2,587**	**17.0**	**15,150**

Comments From the Department of Education

UNITED STATES DEPARTMENT OF EDUCATION

OFFICE OF ELEMENTARY AND SECONDARY EDUCATION

THE ASSISTANT SECRETARY

SEP 21 1992

Mr. Clarence C. Crawford
Associate Director
Education and Employment Issues
United States General Accounting Office
Washington, D.C. 20548

Dear Mr. Crawford:

The Secretary has asked that I respond to your request for our comments on your draft report entitled, Department of Education: Information on the Eisenhower Math and Science State Grant Program (GAO/HRD-92-150).

We have reviewed this draft and believe that it is generally a fair assessment of the Eisenhower program. We wish to express our appreciation for your work, advise you of the measures we are undertaking to improve the administration of the program, and discuss certain issues raised by the report.

The structure of the Eisenhower program is under careful consideration as the U.S. Department of Education develops its proposals for reauthorization of Federal elementary and secondary education programs. Through this process, we will consider issues that the report identified as in need of review.

A brief discussion of several issues follows--

ROLE OF THE EISENHOWER PROGRAM

The report states that, according to the Department, the Eisenhower Mathematics and Science Education Program has been identified as the Federal Government's principal source of support for helping to achieve Goal 4 of the National Education Goals. While the Eisenhower programs constitute the Department's major effort in mathematics and science, other Department efforts such as support for the development of curriculum frameworks and regional consortia to disseminate exemplary materials and provide technical assistance are also essential to the mission of helping the Nation achieve Goal 4.

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SHORT-TERM TRAINING AND DISTRICT-LEVEL PROGRAMS

The report concludes that short-term training cannot be expected to cause major changes in instructional practice (page 6). The issue of short- or long-term training is complex, and consensus about the limited value of short-term training is not as widespread as the draft report seems to indicate. While many educators do believe that intensity and long duration are required for training to produce substantive change, many others believe that short-term training is the appropriate strategy for certain purposes and under certain conditions.

The issue of intensity aside, training designed and carried out at the local level, a central feature of the Eisenhower program, also has the benefit of local governance. The "effective schools" research has shown that change is more likely if plans are made at the school site level. It also follows that, to achieve change at the local level, implemented by teachers in the classroom, the local educational agency (LEA) must have significant involvement and flexibility in designing and implementing training activities. Therefore, we believe that some locally controlled support is essential to the implementation of major and enduring improvements.

NUMBER OF DISTRICTS APPLYING

The report found that 17 percent of the local districts did not participate in the Eisenhower program in 1989-90. However, the SRI, International in-depth study completed in February, 1991, found that 93 percent of school districts nationwide participated either directly or through intermediate units or consortia arrangements in 1988-89. Although two different program years are involved, it seems unlikely that there was a 10 percent decrease in participation between 1989-90 and 1990-91. In any event, data in the draft report reflect a year in which the funding level was $128,440,000. Since that time, funding levels have increased 87 percent, making it more worthwhile for smaller LEAs to expend the effort to meet application and reporting requirements in order to participate. We anticipate that data from 1990-91 performance reports, which are now being compiled, will show a significant increase in district participation.

DATA COLLECTION

The report correctly cites the difficulty the Department has had in collecting adequate data on the Eisenhower program. We have, however, made some progress in this area, and at this time only three reports from a total of two States are missing for the

Page 3 - Mr. Clarence C. Crawford

1989-90 year. While my office has become more active in program monitoring and data collection, our efforts are hindered by the failure of Congress to provide the Department with an adequate salaries and expenses budget, which has limited the ability of my office to hire staff to work with States on data collection.

The report also states that data are not available to allow policy makers to assess the impact of the Eisenhower program. In 1989, the Department commissioned SRI, International, and Policy Studies Associates to conduct the National Study of the Title II/Eisenhower Mathematics and Science Education Program to provide information to the Department and Congressional policy makers. Completed in 1991, this study laid the foundation for continuing efforts by the Department to assess its mathematics and science programs.

The Department has worked to address the need for accurate and current data with the development of an Overall Data Collection Plan that calls for a major study of the impact of the program as well as a modified performance report format. Our proposals are currently under review by the Office of Management and Budget. These efforts should significantly improved data collection on the Eisenhower program as well as collection of information needed for policy decisions on the improvement of mathematics and science education.

Thank you for the opportunity to comment. I and members of my staff are prepared to respond, if you or your representatives have any questions.

Sincerely,

John T. MacDonald

Enclosure

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